

REMARKS

This paper is responsive to the Office Action mailed from the Patent and Trademark Office on May 23, 2003, which has a shortened statutory period set to expire August 23, 2003.

Specification

The specification is objected to at the top of page 2 of the Office Action for incorrectly using reference numbers 113 on page 14, lines 16 and 31 of the specification. As amended herein, paragraphs 0032 of the specification changes "passivation walls 113" to "--passivation walls 210--". No new matter is entered.

Claims

Claims 1-20 are pending in the above-identified application. Claims 1-7, 9-12, and 14-20 are rejected under 35 USC 102, and Claims 8 and 13 are rejected under 35 USC 103 as being unpatentable over cited references that are identified below.

In the current paper, Claims 1 and 9 are amended, and Claims 17-20 are canceled. Claims 2-8 and 10-16 remain as filed. Reconsideration and withdrawal of the pending rejection is respectfully requested.

Rejection Under 35 USC 102

Claims 1-7, 9-12, and 14-20 are rejected under 35 U.S.C. 102 as being anticipated by Bird (USP 6,054,746). The pending rejections are addressed as follows.

Claims 1-7

In the pending paper, Claim 1 is amended to clarify the recited passivation layer/wall structure. In particular, Claim 1 is amended to recite (in part):

An image sensor array comprising...  
a passivation layer formed between the pixel circuitry and the contact pad of each of the plurality of pixels, **wherein the contact pad of each pixel is formed on a first surface of the passivation layer and connected to corresponding pixel circuitry by a via structure passing through the passivation layer;**  
a plurality of passivation walls extending from the first surface of the passivation layer and defining a plurality of trenches, each trench being surrounded by corresponding sections of the plurality of passivation walls, each of the plurality of passivation walls having upper edges, **wherein the contact pad of each pixel is located in an associated trench such that an upper surface of the contact pad is located between the first surface of the passivation layer and the upper edges of the passivation walls;**  
and  
a sensor layer formed over the plurality of passivation walls...

Support for the amendment to Claim 1 is provided, for example, in Applicants' Figs. 2(A) and 2(B), and in paragraph 0032 (pages 14-15 of the specification; reproduced below for reference):

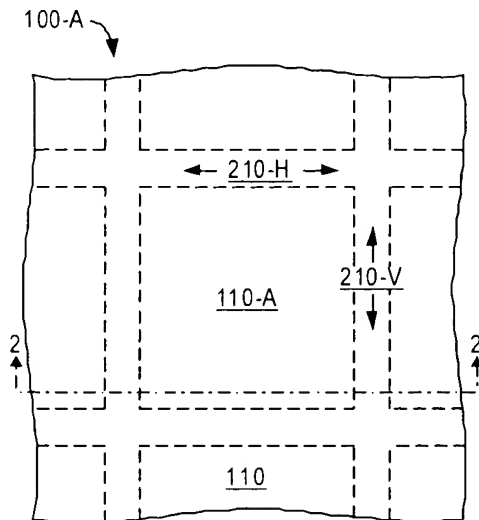


FIG. 2(A)

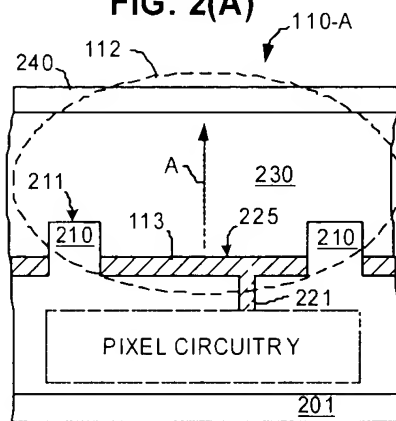


FIG. 2(B)

[0032] In accordance with an aspect of the present invention, passivation walls 210 are formed around each pixel contact pad 113 to provide isolation between adjacent pixel contact pads in order to reduce crosstalk between the contact pads. As indicated in Fig. 2(A), passivation walls 210 have upper edges 211 that extend above an upper surface 225 of each contact pad 113 such that each set of passivation walls 210 surrounding a pixel contact pad 113 defines a trench receiving that pixel contact pad. In one embodiment, passivation walls 210 are formed when isolation trenches are patterned into a passivation layer in the same process used to form the vias to the metal contact pads [e.g., via 221 shown in Fig. 2(B)].

As amended, Claim 1 is distinguished over Bird at least because Bird fails to teach or suggest forming an image sensor including which "a plurality of passivation walls extending from the first surface of the passivation layer and defining a plurality of trenches, each trench being surrounded by corresponding sections of the plurality of passivation walls, each of the plurality of passivation walls having upper edges, wherein the contact pad of each pixel is located in an associated trench such that an upper surface of the contact pad is located between the first surface of the passivation layer and the upper edges of the passivation walls", as recited in amended Claim 1.

Claims 2-7 are dependent from Claim 1, and are distinguished over the cited prior art for at least the reasons provided above with respect to Claim 1.

Claims 9-12 and 14-16

Claim 9 is amended herein to recite (in pertinent part):

...a plurality of pixels including a first pixel having a first contact pad and a second pixel having a second contact pad that is separated from the first contact pad by an elongated interface region, **wherein the first pixel further includes pixel circuitry located below the first contact pad**, the pixel circuitry;

a continuous sensor layer formed over the plurality of pixels and having lower portions contacting the first and second contact pads, respectively; and

a plurality of conductors including a first conductor **located between the pixel circuitry and the first contact pad** and extending under the interface region separating the first and second contact pads,

wherein the plurality of conductors are connected to a low voltage source such that the first conductor generates a field that impedes the flow of electrons across the interface region from the first contact pad of the first pixel to the second contact pad of the second pixel.

Support for the amendment to Claim 9 is provided in Applicants' specification, for example, in Fig. 4(A) (reproduced below for reference) and in paragraph 0039 of Applicants' specification (both reproduced below for reference):

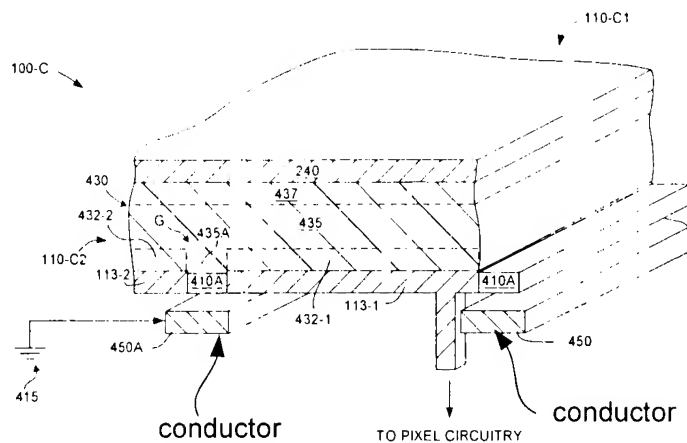


FIG. 4(A)

[0039] In accordance with another aspect of the present invention, CMOS image sensor array 100-C includes a series of conductors 450A located under interface regions G (e.g., under passivation portions 410A) and biased by a fixed bias voltage 415 to provide active control of the interface between pixels 110-C1 and 110-C2. When fixed bias voltage 415 is 0V or a negative voltage with respect to pixel contact pads 113-1 and 113-2, conductor 450A actively removes electrons from the interface region between these pixel contact pads, thereby effectively causing the interface to act as a transistor that is turned off.

The pending rejection relies on Bird's row conductors 4 to meet the "conductors" limitation of Claim 9. As amended, Claim 9 is believed to be distinguished over Bird at least because Bird's conductors 4 are not "located between the pixel circuitry and the first contact pad", as recited in Claim 9.

Claims 10-12 and 14-16 are dependent from Claim 9, and are believed to be distinguished over Bird for at least the reasons provided above with reference to Claim 9.

#### Claims 17-20

Claims 17-20 are canceled, thereby obviating the rejections directed to these claims.

For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 USC 102.

Rejection Under 35 USC 103

Claims 8 and 13 are rejected under 35 U.S.C. 103 as being unpatentable over Bird (USP 6,054,746) in view of Cox et al. (USP 5,043,582).

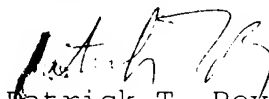
Claims 8 and 13 depend from Claims 1 and 9, which are distinguished over Bird for the reasons provided above. Cox fails to overcome the deficiencies discussed above with respect to Bird. Therefore, Claims 8 and 13 are believed to be distinguished over Bird and Cox for at least the reasons provided above with reference to Claims 1 and 9.

For at least the above reasons, Applicants respectfully request reconsideration and withdrawal of the rejections under 35 USC 103.

CONCLUSION

Claims 1-16 are pending in the present Application. Reconsideration and allowance of these claims is respectfully requested. If there are any questions, please telephone the undersigned at (408) 451-5902 to expedite prosecution of this case.

Respectfully submitted,



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I hereby certify that this correspondence is being deposited with the United States Postal Service as FIRST CLASS MAIL in an envelope addressed to: Mail Stop Non-Fee Amendment, Commissioner for Patents, P.O. Box 1450, Alexandria, VA 22313-1450, on August 12, 2003.

8/12/03      Richard A. Palmer  
Date                      Signature